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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,920	10/15/2001	Charles Douglas Murphy		2089

30320 7590 09/23/2004  
CHARLES DOUGLAS MURPHY  
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EVANSTON, IL 60202

EXAMINER

DO, CHAT C

ART UNIT PAPER NUMBER

2124

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/976,920	MURPHY, CHARLES DOUGLAS	
	Examiner	Art Unit	
	Chat C. Do	2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10/15/01; 06/14/02; 04/09/03.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/15/01</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention, particularly all the independent claims. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

### ***Claim Objections***

2. Claims 8 and 16 are objected to because of the following informalities:

The applicant is advised to insert either the term "or" or "and" in between conditions for clarification.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-6, 7-8, 10-11, 13-14, and 15-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 2, the term "can" in line 3 is a relative term which renders the claim indefinite. The term "can" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would

not be reasonably apprised of the scope of the invention. Claims 3, 6, 10-11, and 14 have the same problem.

Re claim 4, the term "may be" in line 4 is a relative term which renders the claim indefinite. The term "may be" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. In addition, the limitation "second real multiplier means does not use the first product" is indefinite because the precedence claims disclose the second real multiplier means using one or more members from the first product in lines 13-15. For examination purposes, the examiner considers the second real multiplier means does not produce the first product but it does use or utilize the first product. Claims 5 and 13 have the same problem.

Re claim 7, the limitation "computing a second product equal to the product of first number and second number" in lines 8-10 is indefinite because the second product is equal to the product of the first number and third number. For examination purposes, the examiner considers the second product is equal to the product of the first number and third number. Claim 15 has the same problem.

Re claim 8, the limitation "the complex conjugate" in lines 2-3 lacks an antecedence basis. For examination purposes, the examiner considers the limitation as any complex conjugate. Claim 16 has the same problem.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kosugi (U.S. 6,223,197).

Re claim 1, Kosugi discloses in Figures 2-4 a machine used in computing one or more sums of products (e.g. in Figure 2  $Ax2^6$ ,  $Ax2^2$ ,  $Ax2^0$ , and  $Ax2^{59}$ ) wherein at least one of sums of products (e.g. in Figure 2  $Ax2^6$ ,  $Ax2^2$ , and  $Ax2^0$ ) is not a desired product of two numbers, (the desired product is  $Ax2^{59}$ ) comprising: a. a first real number (e.g. A) represented in a first finite-precision numeric format; a second real number (e.g.  $2^2$ ) represented in a second finite-precision numeric format; c. a third real number (e.g. 59) represented in a third finite-precision numeric format; d. first real multiplier means (lower portion of Figure 2 wherein to produce  $Ax2^0$  and  $Ax2^2$ ) for computing a first set of intermediate terms and a first product, first product (e.g.  $Ax2^2$ ) being the product of first real number (A) and second real number ( $2^2$ ); second real multiplier means (upper portion of Figure 2 wherein to produce  $Ax59$ ) for computing a second product, second product being the product of first real number (A) and third real number (59) and second real multiplier means (upper portion of Figure 2) using one or more members of the set consisting of first product (output of  $Ax2^2$ ) and first set of intermediate terms ( $Ax2^0$ ) whereby first real multiplier means and second real multiplier means share computation

(sharing the output of product) and can have lower implementation cost than if first product and second product were computed separately (abstract lines 1-4).

Re claim 2, Kosugi further discloses in Figures 2-4 a second real multiplier means cannot compute the product of first real number and second real number (the upper portion does not compute the first product, but it utilized the output of the first product only), whereby second real multiplier means can have lower implementation cost than if it must also be able to compute the product of first real number and second real number (abstract lines 1-4).

Re claim 3, Kosugi further discloses in Figures 2-4 a first real multiplier means cannot compute the product of first real number and third real number (the lower portion does not compute the second product, but it was utilized to output of the desired product only), whereby the first real multiplier means can have lower implementation cost than if it must also be able to compute the product of first real number and third real number (abstract lines 1-4).

Re claim 4, Kosugi further discloses in Figures 2-4 a second real multiplier means does not use first product (upper portion utilized the output of first adder 5 to compute the desired product), whereby first product and second product may be computed in a parallel manner (lower portion and upper portion are computed in parallel in Figure 2).

Re claim 5, Kosugi further discloses in Figures 2-4 including additive means (e.g. 5 and 10) for adding first product and second product to a first product sum (e.g. output of 10), where first product sum is not a desired product of two numbers, whereby first

product, second product, and first product sum may be computed with lower cost than if each is computed separately (abstract lines 1-4).

Re claim 6, Kosugi further discloses in Figures 2-4 including first additive means for adding first product to a first product sum and second additive means for adding second product to a second product sum, where first product sum and second product sum are separate product sum such that one or both of the following properties hold: a. there is at least one sum of products to which first product sum contributes and to which second product sum does not contribute (5) b. there is at least one sum of products to which second product sum contributes and to which first product sum does not contribute (10) whereby machine can be used for computing and adding the contribution of first real number to two separate outputs of a signal processing transform.

Re claim 7, Kosugi discloses in Figures 2-4 machine used in computing one or more sums of products (e.g. in Figure 2  $Ax2^6$ ,  $Ax2^2$ ,  $Ax2^0$ , and  $Ax2^{59}$ ) wherein at least one of sums of products is not a desired product of two numbers (e.g. in Figure 2  $Ax2^6$ ,  $Ax2^2$ , and  $Ax2^0$ ), comprising: a. a first number (A) in a first finite-precision numeric format b. a second number (e.g.  $2^2$ ) in a second finite-precision numeric format; a third number (e.g. 59) in a third finite-precision numeric format d. multiplier means (Figure 2) for computing a first product (second input to 5) equal to the product of first number (A) and second number ( $2^2$ ) and for computing a second product ( $Ax59$ ) equal to the product of first number (A) and second number (59), where at least one of the calculation results used in computing first product is also used in computing second product (the second

product is computed by combining the first product with  $2^6$ ) whereby multiplier means computes at least two products using at least one shared calculation result.

Re claim 8, Kosugi further discloses in Figures 2-4 a second product is not equal to the product of first number and the complex conjugate of second number (inherently  $Ax59$  is not the same as  $0jx2^2$ ) except in the following cases: second number is equal to the complex conjugate of third number or/and first number is zero ( $A = 0$ , then every product is equal to zero which is equal to each other) b. second product is not equal to the product of second number and the complex conjugate of first number (inherently  $Ax59$  is not the same as  $0jx59$ ) except in the following cases: first number is real, and second number is equal to third number or/and first number is zero ( $A = 0$ , then every product is equal to zero which is equal to each other) whereby multiplier means is not a multiple-output multiplier which computes the product of two numbers and the product of two numbers with one of the numbers conjugated.

Re claim 9, it is a method claim of claim 1. Thus, claim 9 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 10, it is a method claim of claim 2. Thus, claim 10 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 11, it is a method claim of claim 3. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 12, it is a method claim of claim 4. Thus, claim 12 is also rejected under the same rationale as cited in the rejection of rejected claim 4.



Re claim 13, it is a method claim of claim 5. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 14, it is a method claim of claim 6. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 15, it is a method claim of claim 7. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 16, it is a method claim of claim 8. Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 5,831,883 to Suter et al. disclose a low energy consumption, high performance fast Fourier transform.
- b. U.S. Patent No. 5,841,684 to Dockser discloses a method and apparatus for computer implemented constant multiplication with multipliers having repeated patterns including shifting of replicas and patterns having at least two digit positions with non-zero values.
- c. U.S. Patent No. 5,930,160 to Mahant-Shetti discloses a multiply accumulate unit for processing a signal and method of operation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do  
Examiner  
Art Unit 2124

September 15, 2004



**ANIL KHATRI**  
**PRIMARY EXAMINER**